

Should I worry about Tropical Cyclones even if we are going through a drought?

The answer may surprise you!

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Drought is one of the most popular topics this summer...not tropical cyclones. The day-by-day conversation among people living mainly in the eastern half of Puerto Rico is drought. Puerto Rico is suffering one of the worst droughts in recent history. The 2015 event is due to a deficit in rainfall which started in 2013. As of June 16, 2015, the U.S. Drought Monitor classified near 7 percent of the island with Severe Drought, around 34 percent with Moderate Drought and 59 percent abnormally dry. Other significant droughts occurred between 1966-1969, with the driest year in 1967 and another and probably the worst and most remembered drought in recent history affected Puerto Rico between 1993-1996, with 1994 as the driest year. In addition a dry spell occurred in 1997 affecting also the water reservoirs in Puerto Rico.

No significant improvement in these dry conditions is expected at least in the next upcoming months. With the ongoing drought, some question and doubts have arisen in the past couple of months. The most common questions have been: “Are you telling me this drought could continue into the peak of the hurricane season?”, “So, no hurricanes or tropical storms or even tropical depression are going to affect us, right?”, “If we are in a drought, a tropical storm or hurricane could save us from the drought”.

So, I felt this was the right time to answer those questions and clarify some doubts which, in fact, are legitimate questions since it is not in every hurricane season we experience droughts. It is imperative to raise the awareness to our community.

Should I worry about Tropical Cyclones even if we are going through a drought?

Yes. Not only now, but always! The first thing to keep in mind is that Tropical Cyclones don't discriminate if we are experiencing drought or not. And most important, they don't choose which municipalities, island or territory are going to affect, with not only the rainfall and dangerous flash flooding and potential mudslides, but also damaging winds and storm surge, just to mention some hazards associated with tropical cyclones.

“So, no hurricanes or tropical storms or even tropical depression are going to affect us, right?”

The answer to this question is the same with drought or without a drought: We are in the path of tropical cyclones. It's that simple. The images below show the cumulative tracks of all recorded cyclones through the North Atlantic and Eastern Pacific. (Fig 1. & Fig 2.)

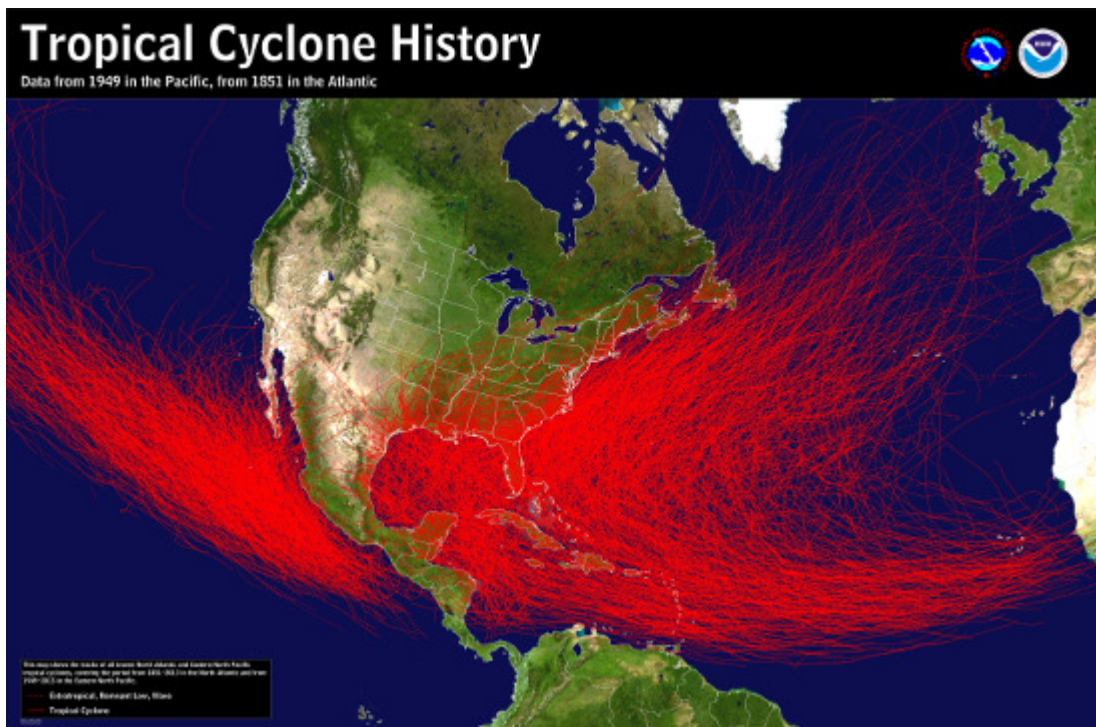


Fig 1: Tropical Cyclone History. Data from 1948 in the Pacific, from 1851 in the Atlantic. Image is from National Hurricane Center.

<http://www.nhc.noaa.gov/climo/>

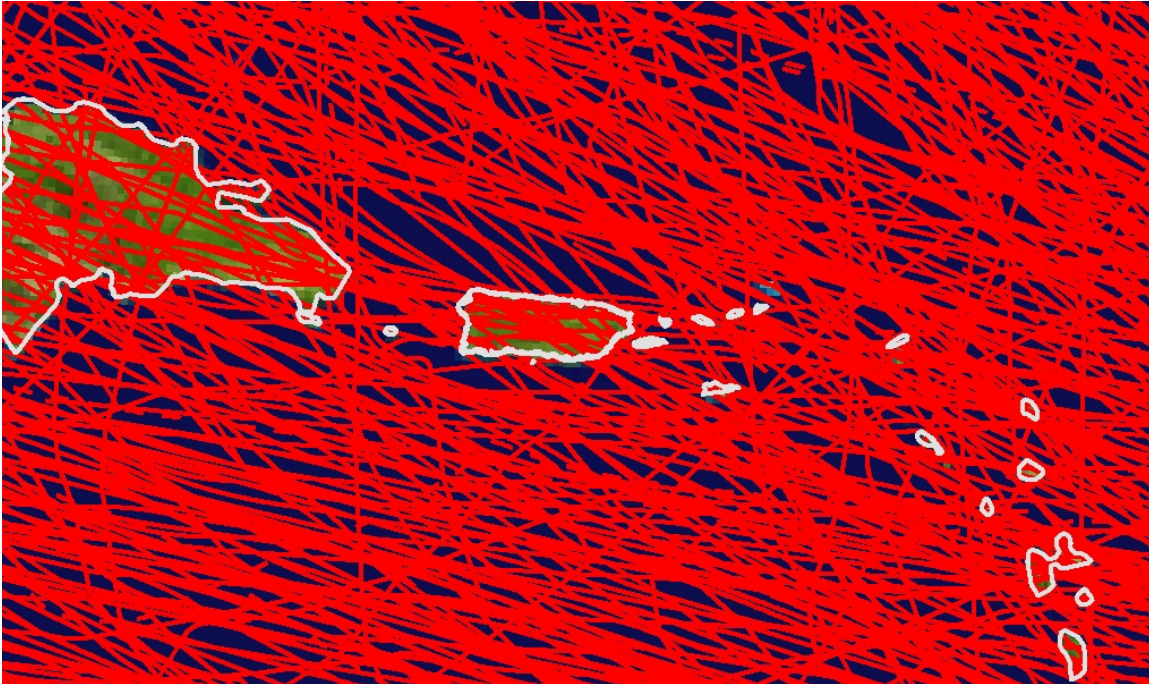


Fig 2: Tropical Cyclone History. Close-up over Puerto Rico and the U.S. Virgin Islands. Data from 1948 in the Pacific, from 1851 in the Atlantic. Image is from National Hurricane Center <http://www.nhc.noaa.gov/climo/>

We have precedents which are useful to let the public and our communities understand the importance of been prepared before the start of the hurricane season and be ready to save your life and property if one of these systems threatens our local area. In fact, in 1967 which was mentioned earlier as the driest of the 1966-1969 drought, we were seriously affected by Hurricane Beulah. From NOAA's National Centers for Environmental Information archive, (<http://www.ncdc.noaa.gov/IPS/sd/sd.html>) "Hurricane Beulah moved to within 100 miles south of Ponce by 8:00 PM on September 9th on a west northwest course. (Fig 3.) The hurricane passed just south of Mona Passage on the 10th and took a westerly course just south of Dominican Republic. Most storm damage occurred in the coastal area between Cabo Rojo and the city of Ponce. About 16 shacks were demolished by the rough sea and some 20 others damaged. Three small craft were destroyed and a number of others damaged or swept to sea. Flood waters destroyed a bridge and damaged several cars".

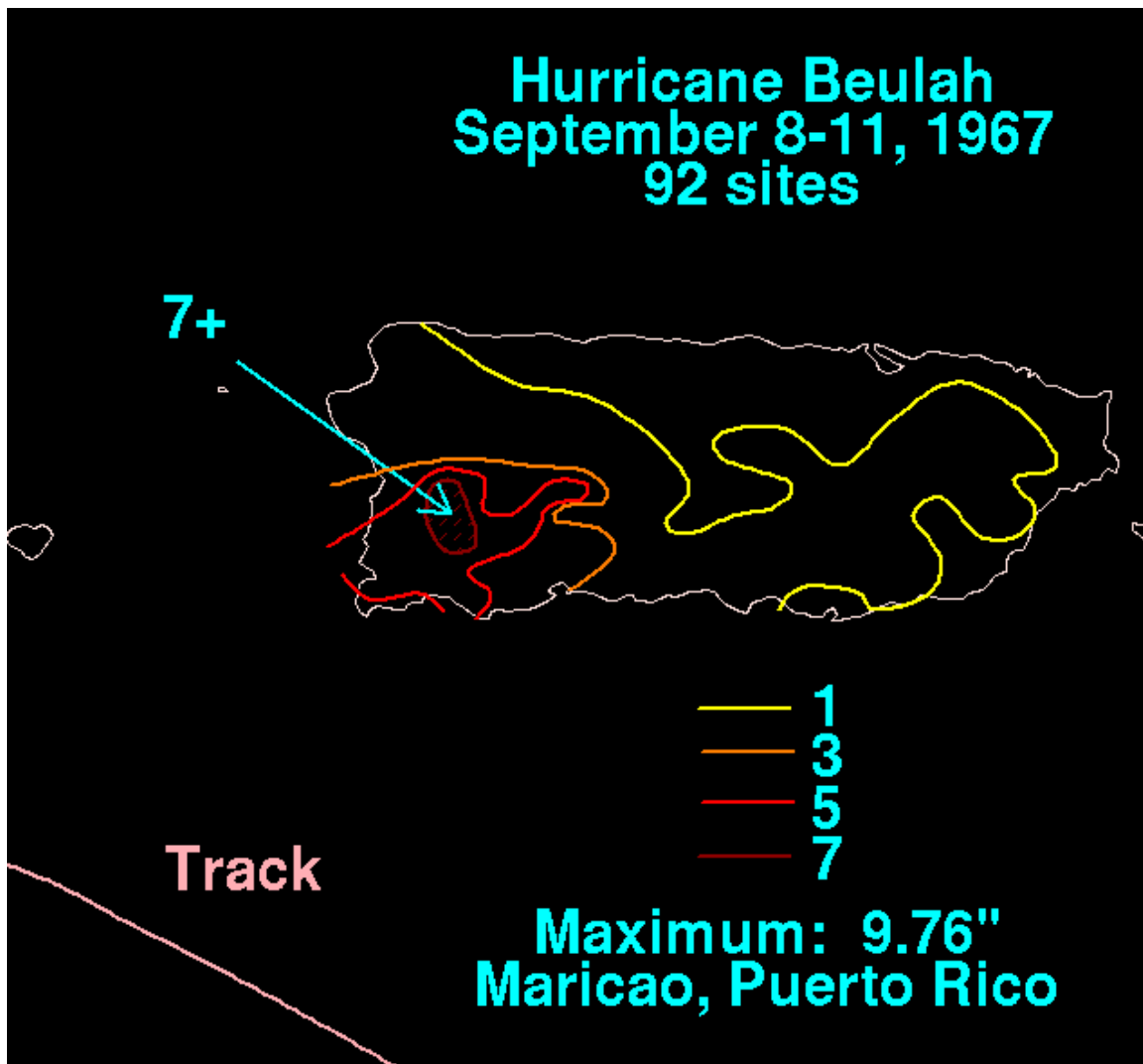


Fig 3. Hurricane Beulah rainfall totals over Puerto Rico between September 8-11, 1967. Image can be found at <http://www.wpc.ncep.noaa.gov/tropical/rain/beulah1967.html>

What happened in 1994 drought during the hurricane season?

In August 1994, the drought worsened. From NOAA's National Centers for Environmental Information archive: "Island wide drought continued across Puerto Rico. Dry soils covered 40% of the island. Saturated soils covered 5% of the island. La Plata reservoir water level was forty-nine feet below spillway. Carraizo reservoir water level was eighteen feet below spillway, although during the second week the Carraizo reservoir level dropped to its lowest elevation of twenty-four feet below spillway".

The tropical cyclone event to affect Puerto Rico in 1994 occurred in September 9-10, when Tropical Storm Debby passed around 200 miles south of San Juan. From NOAA's National Centers for Environmental Information archive, "The center of Tropical Storm Debby passed about 200 miles south of San Juan on 09-10 at 2000 AST. The strongest winds were felt at San Juan around 1145 AST and 1423 AST when peak gusts of 38 knots were recorded at the Luis Munoz Marin International Airport. Most of the damage associated with "Debby" was from downed trees and power lines across several sectors of the island. A tree fell on a wood house at Barrio Pinas in San Juan destroying the structure. In Manati, at the Pregnado sector a house lost its roof. Heavy surf and rough seas intruded into some coastal houses at Santa Isabel and Juana Diaz. Road 3, and La Fanduca sector at Naguabo were threatened by the heavy surf, although in front of Tito's Mikes, and at the Tropical Beach urbanization the sea intruded into the road. At Yabucoa rough seas also threatened two houses at Playa El Negro forcing the families to seek shelter. The ferry boat was unable to leave safe port at Culebra due to rough seas; twenty-five passengers were stranded at the island. Only one indirect death and one injured were attributed to "Debby" when a wave overtook two shore fishermen at Barrio Los Morrillos in Cabo Rojo".

Ten days later on September 20th 1994, although was not a tropical cyclone, a very active tropical wave moved over the region, dumping between two and eight inches of rain across the eastern part of the island ending the hydrological drought for sections of the San Juan Metropolitan area served by the Carraizo reservoir.

1997 dry spell across Puerto Rico and Hurricane Erika

April 1997 was the driest April ever in San Juan, and the second driest month. Many towns went through the entire month without any rain. During this dry spell which started on March 15, 1997 the north coast and north slopes only recorded 14-15 percent of the normal rain. Island wide only 19 percent of the normal rain was registered during this period. Only 0.08 inches of rain were registered at the Luis Munoz Marin International airport, shattering the previous record of 0.28 inches in April 1984.

However on August 22nd 1997, showers and thunderstorms associated to a tropical wave began to pound the southeast section of Puerto Rico during the early morning. By late morning the rains spread to the northeast

municipalities of Luquillo and Rio Grande. Civil Defense in Naguabo reported river Rio Blanco out of its banks and water covering highway 191. Lightning provoked power outages in several areas across the island. The amount of rainfall over the Carraizo basin caused the water level to increase above the maximum and the floodgates of the lake were opened.

Weeks later, in September 6-7 1997, Hurricane Erika (Fig 4.) was the only named tropical cyclone to be tracked in September. It formed in the central Atlantic on the 3rd, strengthened to a hurricane on the 5th, and passed just northeast of the U.S.V.I. and P.R. on the 6th and 7th as it continued to strengthen. Erika's strongest winds missed P.R. but the extreme outer rainbands caused gusty winds and some rains across P.R. A hurricane watch was issued for Puerto Rico, Vieques and Culebra at 11 am ast on the 5th which remained in effect until 5 pm ast on the 7th. Maximum sustained winds of 23 mph from the west were recorded at the Luis Munoz Marin Airport on the 7th. A peak gust of 42 mph was recorded on the afternoon of the 6th. Rainfall across P.R varied from 0.29 inches at Carolina to 0.77 inches at Caguas. Northeast swells of ten to twelve feet produced some coastal flooding and beach erosion along the north coast. Eight families were evacuated from their homes in the municipality of Dorado's Costa de Oro Urbanization. On road 187 in Piñones and Loiza was closed after sections of the road were flooded or washed by the sea. Wind gusts associated to the outer spiral bands snapped tree branches disrupting electrical service in sectors of San Juan, Guaynabo and Bayamon. Power failures affected ten to twelve thousand residents.

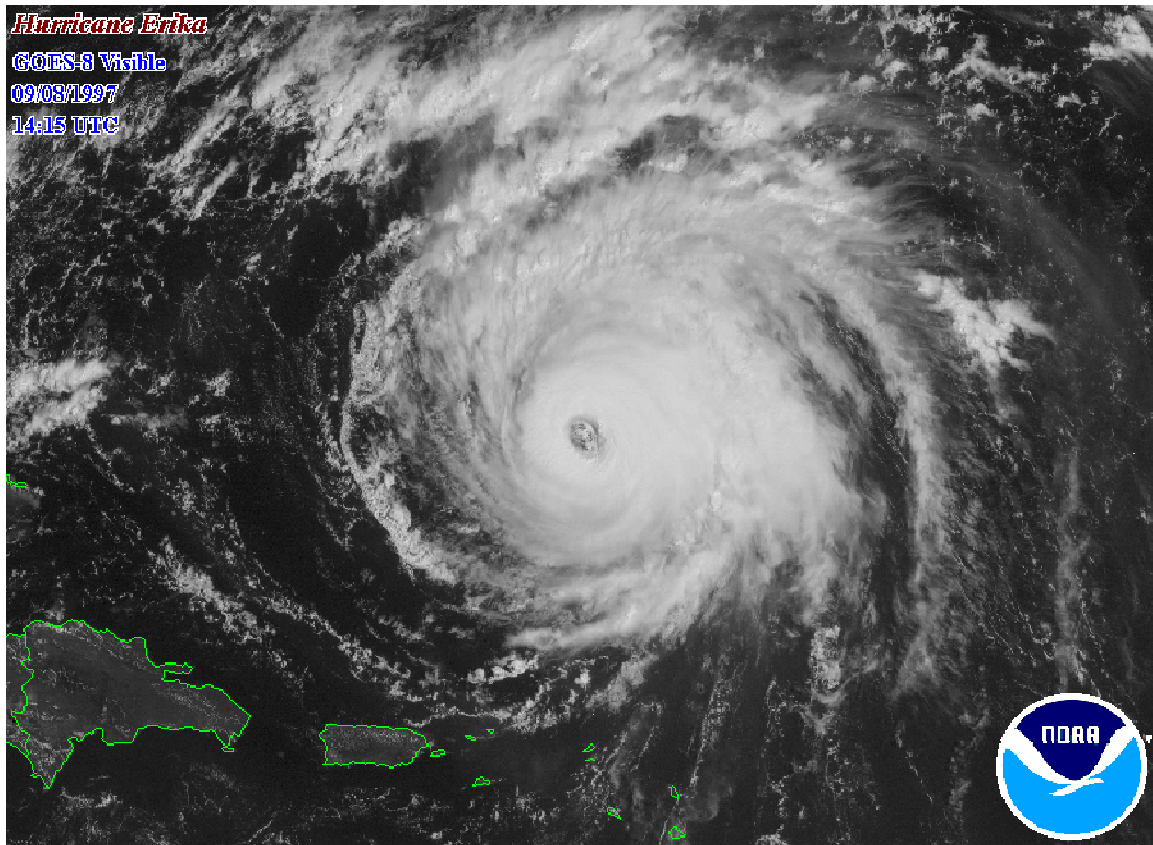


Fig 4. Hurricane Erika passing northeast of Puerto Rico and the U.S. Virgin Islands on September 8, 1997.

Conclusion

Tropical Cyclones and even Tropical Waves could bring serious damages to our infrastructure, agriculture and to our lives and property even if we are experiencing a drought or a period with rainfall deficit. Tropical Cyclones not only bring rain. It also brings several hazards that will put you and your family at risk. The history tells us that even in years of lack of rainfall; we have been seriously affected by these systems. At any time, mainly during the peak of the hurricane season which runs from mid-July through mid-October for our area, we could be threatened by one of these tropical cyclones. Don't underestimate the danger produced by tropical waves either. Strong tropical waves could bring serious flash flooding and mudslides across the region, even during dry spells, droughts, and when hurricane seasons are forecast to be below normal in activity. The message is the same: Be prepared! Only takes one.